

■ 车规片式陶瓷电容器--AM 系列 Automotive MLCC--AM Series

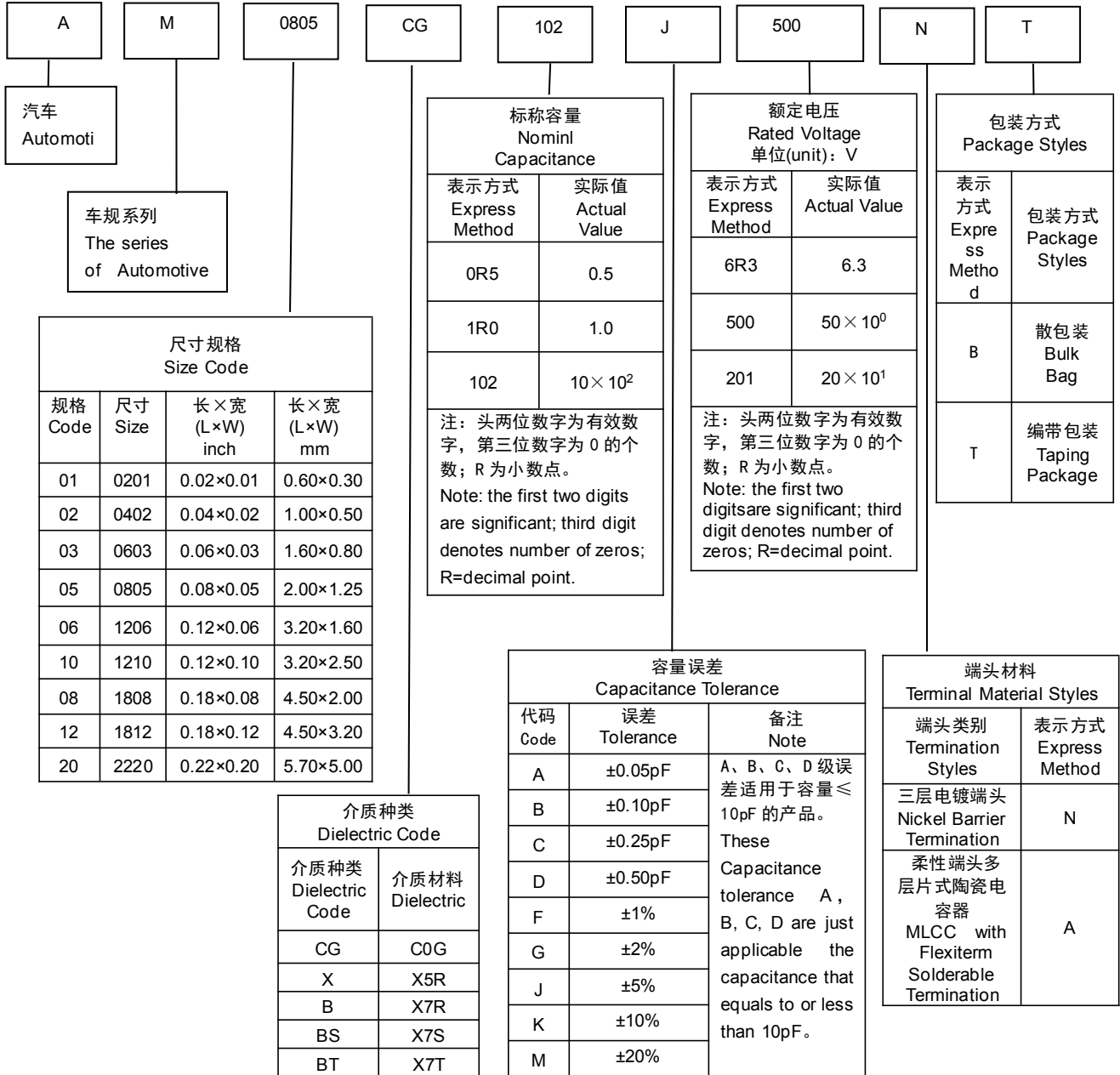
◆ 特征 Feature

- * 叠层独石结构，具有高可靠性能
There is high reliability on monolithic structure of laminated layers.
- * 具有优良的焊接与耐焊性能，适用于回流焊接与波峰焊接
And its character of excellent soldering ability and soldering resistance ability is suitable for reflow soldering and peak soldering.
- * 具有较高的容量且容量性能稳定
It includes high and stable capacitance.
- * 此类电容器为汽车专用电子元器件，已通过 AEC-Q200 标准设定的所有实验条件，在汽车使用过程中更具稳定性、安全性
This type of capacitor is a special electronic component for automobiles, which has passed all the experimental conditions set by the AEC-Q200 standard, and is more stable and safe during automobile use
- * 材料使用主要有温度稳定性较高的 C0G 以及高介电常数的 X7R、X5R、X7S、X7T
The materials used mainly include C0G with high temperature stability and X7R, X5R, X7S, and X7T with high dielectric constant
- * 执行标准：GB/T 21041-2007 GB/T 21042-2007 AEC-Q200
Executive Standard: GB/T 21041-2007 GB/T 21042-2007 AEC-Q200



◆ 应用 Application

代号	应用描述
U	<ul style="list-style-type: none"> * 满足 AEC-Q200 Meet AEC-Q200 requirements * 用于车内信息、多媒体、导航、装饰等通用的舒适娱乐模块； It is a general comfort and entertainment module for in-car information, multimedia, navigation, decoration, etc * 禁用于涉及安全模块的应用，如 ABS、电池、动力传输等 Disabled for applications involving safety modules such as ABS, batteries, power transmission, etc
M	<ul style="list-style-type: none"> * 满足 AEC-Q200 Meet AEC-Q200 requirements * 适用于引擎 ECU 等的驱动系统控制、安全气囊、ABS 等的安全控制装置； It is suitable for driving system control such as engine ECUs, airbags, ABS, etc
E	<ul style="list-style-type: none"> * 满足 AEC-Q200 Meet AEC-Q200 requirements * 采用树脂端头工艺，更有效有效抑制板间弯曲产生的应力裂纹，适用于车载电源控制、电池线等易弯曲模块、动力传输模块。 The resin end process is adopted to more effectively suppress stress cracks caused by bending between plates, and is suitable for bendable modules such as on-board power control and battery lines, and power transmission modules.
P	<ul style="list-style-type: none"> * 满足 AEC-Q200 Meet AEC-Q200 requirements * 开路模式产品设计，可以避免开裂导致的瞬间短路烧毁。适用于汽车电池线、动力传输模块。 The open-circuit mode product design can avoid instantaneous short circuit burning caused by cracking. Suitable for automotive battery lines and power transmission modules.
S	<ul style="list-style-type: none"> * 满足 AEC-Q200 Meet AEC-Q200 requirements * 符合 IEC60384-14 Complies with IEC60384-14 * 适用于电池充电器、变频器、DC-DC 转换器等 Suitable for battery chargers, frequency converters, DC-DC converters, etc

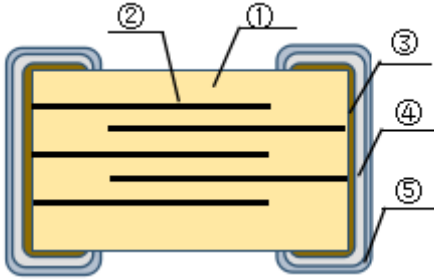
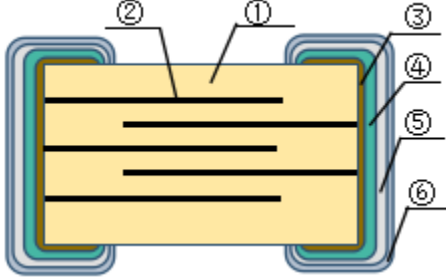
◆ 型号表示法
How To Order

◆ 温度系数/特性 Temperature Coefficient /Characteristics

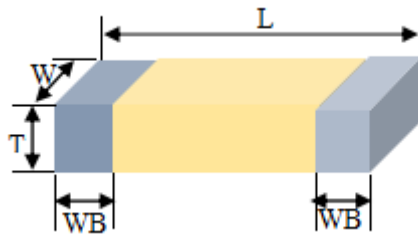
介质种类 Dielectric	参考温度点 Reference Temperature Point	标称温度系数 Temperature Coefficient	工作温度范围 Operation Temperature Range
COG	20℃	0±30 ppm/℃	-55℃~125℃
X5R	20℃	±15%	-55℃~85℃
X7R	20℃	±15%	-55℃~125℃
X7S	20℃	±22%	-55℃~125℃
X7T	20℃	-33%~22%	-55℃~125℃

备注: I 类电容器标称温度系数和允许偏差是采用温度在 20℃ 和 85℃ 之间的电容量变化来确定的, 而 II 类电容器标称温度系数是按照工作范围之间的电容量相对 20℃ 的电容量变化来确定的。

Note: Nominal temperature coefficient and allowed tolerance of class I are decided by the changing of the capacitance between 20℃ and 85℃. Nominal temperature coefficient of class II are decided by the temperature of 20℃.

◆ 产品结构
Product Structure

项目 Item	N 端头 (Cu/Ni/Sn 三层端头) N-Terminal (Cu/Ni/Sn Three-layer Terminal)	A 端头 (柔性端头) A-Terminal (Flexible Terminal)
结构示意图 Structure Diagram		
代码描述 Code Description	①陶瓷介质(Ceramic Dielectric) ②镍电极(Nickel Electrode) ③铜电极层(Copper electrode Layer) ④镍层(Nickel Layer) ⑤锡层(Tin Layer)	①陶瓷介质(Ceramic Dielectric) ②镍电极(Nickel Electrode) ③铜电极层(Copper electrode Layer) ④导电性树脂 (Conductive Resin) ⑤镍层(Nickel Layer) ⑥锡层(Tin Layer)

◆ 产品尺寸
Product Dimensions


代号 Code	英制表示 British expression	公制表示 Metric expression	尺寸 (mm)				备注
			L	W	T	WB	
01	0201	0603	0.6±0.03	0.3±0.03	0.3±0.03	0.15±0.05	C≤47nF
			0.6±0.05	0.3±0.05	0.3±0.05	0.15±0.05	C>47nF
02	0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.05	C<1μF
			1.00±0.15	0.50±0.15	0.50±0.15	0.25±0.05	1μF≤C<10μF
03	0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.35±0.20	C≤1μF
			1.60±0.20	0.80±0.20	0.80±0.20	0.35±0.20	C>1μF
05	0805	2012	2.00±0.20	1.25±0.20	0.80±0.20	0.50±0.20	C≤0.47μF
					1.25±0.20	0.50±0.20	C>0.47μF
06	1206	3216	3.20±0.30	1.60±0.30	0.80±0.20	0.60±0.30	—
					1.25±0.20		
					1.60±0.30		
10	1210	3225	3.20±0.30	2.50±0.30	≤2.80	0.60±0.30	—
08	1808	4520	4.50±0.40	2.00±0.20	≤2.20	0.60±0.30	—
12	1812	4532	4.50±0.40	3.20±0.30	≤3.50	0.60±0.30	—
20	2220	5750	5.70±0.40	5.00±0.40	≤3.50	0.60±0.30	—

备注：1、产品具体厚度“T”查阅本承认书中“容量范围及其电压”。

2、可根据客户的特殊要求设计符合客户需求的产品。

Note: 1、The specific thickness of the product can read "capacity range and voltage" in this approval sheet.

2、We can design according to customer special requirements

◆ **容量范围及其电压**
Capacitance Range and Operating Voltage

* I 类电容器具体电压对应容量及厚度情况列表
 A list of the specific voltage-specific capacitors of Class I capacitors

AM01、AM02、AM03——“N”端头产品 (“N” terminal products)

材料 Dielectric	C0G						
	01 (0.6mm*0.3mm)	02 (1.0mm*0.5mm)		03 (1.6mm*0.8mm)			
尺寸 Dimensions							
电压 Voltage	50V	50V	100V	50V	100V	250V	
0.1pF	0.3±0.03	0.50±0.05	0.50±0.05	0.80±0.10	0.80±0.10	0.80±0.10	
0.2pF							
0.5pF							
1pF							
1.2pF							
1.5pF							
1.8pF							
2.0pF							
2.2pF							
2.7pF							
3.0pF							
3.3pF							
3.6pF							
3.9pF							
4.7pF							
5.0pF							
5.6pF							
6.8pF							
8.0pF							
8.2pF							
10pF							
12pF							
15pF							
18pF							
22pF							
27pF							
33pF							
39pF							
47pF							
56pF							
68pF							
100pF							
120pF		0.50±0.05		0.80±0.10	0.80±0.10	0.80±0.10	
150pF							
180pF							
220pF							
270pF							
330pF							
390pF		0.50±0.05		0.80±0.10	0.80±0.10		
470pF							
560pF							
680pF							
1nF							
1.5nF			0.80±0.10				
1.8nF							
2.2nF							

备注：1、对应产品设计厚度，单位：mm 2、可根据客户的特殊要求设计符合客户需求的产品

Note: 1、Corresponding product design thickness , unit:mm 2、We can design according to customer special requirements

AM05、AM06——“N”端头产品（“N” terminal products）

材料 Dielectric	C0G									
尺寸 Dimensions	05 (2.0mm*1.25mm)				06 (3.2mm*1.6mm)					
电压 Voltage	50V	100V	250V	500V	50V	100V	250V	500V	1000V	2000V
0.5pF										
1pF										
1.2pF										
1.5pF										
1.8pF										
2.0pF										
2.2pF										
2.7pF										
3.0pF										
3.3pF										
3.6pF										
3.9pF										
4.7pF										
5.0pF										
5.6pF										
6.8pF	0.80 ±0.20	0.80 ±0.20	0.80 ±0.20	0.80 ±0.20	0.80 ±0.20	0.80 ±0.20	0.80 ±0.20	1.25 ±0.20	1.25 ±0.20	
8.0pF										
8.2pF										
10pF										
12pF										
15pF										
18pF										
22pF										
27pF										
33pF										
39pF										
47pF										
56pF										
68pF										
100pF										
120pF										
150pF										
180pF	0.80 ±0.20	0.80 ±0.20	0.80 ±0.20	1.25 ±0.20						
220pF										
270pF				1.25 ±0.20						
330pF	0.80 ±0.20	0.80 ±0.20	0.80 ±0.20		0.80 ±0.20	0.80 ±0.20	0.80 ±0.20	1.25 ±0.20	1.25 ±0.20	
390pF										
470pF										
560pF										
680pF	0.80 ±0.20	0.80 ±0.20	0.80 ±0.20		0.80 ±0.20	0.80 ±0.20	0.80 ±0.20	1.25 ±0.20	1.60 ±0.30	
1nF								1.60 ±0.30		
1.5nF					1.25 ±0.20	1.25 ±0.20	1.25 ±0.20			
1.8nF										
2.2nF	0.80 ±0.20									
2.7nF										
3.3nF					1.25 ±0.20					
4.7nF										

备注：1、对应产品设计厚度，单位：mm 2、可根据客户的特殊要求设计符合客户需求的产品

Note: 1、Corresponding product design thickness , unit:mm 2、We can design according to customer special requirements

AM10、AM08——“N”端头产品 (“N” terminal products)

材料 Dielectric	COG								
	10 (3.2mm*2.5mm)				08 (4.5mm*2.0mm)				
尺寸 Dimensions	250V	500V	1000V	2000V	250V	500V	1000V	2000V	3000V
电压 Voltage	250V	500V	1000V	2000V	250V	500V	1000V	2000V	3000V
1pF									
1.2pF									
1.5pF	1.25±0.20	1.25±0.20	1.25±0.20		1.60±0.30	1.60±0.30	1.60±0.30		
1.8pF									
2.0pF									
2.2pF									
2.7pF									
3.0pF									
3.3pF									
3.6pF									
3.9pF									
4.7pF									
5.0pF									
5.6pF									
6.8pF									
8.0pF									
8.2pF									
10pF									
12pF	1.25±0.20	1.25±0.20	1.25±0.20	1.60±0.30	1.60±0.30	1.60±0.30	1.60±0.30	1.60±0.30	1.60±0.30
15pF									
18pF									
22pF									
27pF									
33pF									
39pF									
47pF									
56pF									
68pF									
100pF									
120pF									
150pF									
180pF									
220pF									
270pF	1.25±0.20	1.25±0.20	1.60±0.30						
330pF									
390pF									
470pF	1.25±0.20	1.25±0.20			1.60±0.30	1.60±0.30	1.60±0.30		
560pF									
680pF									
1nF									
1.5nF	1.25±0.20	1.60±0.30			1.60±0.30	1.60±0.30			
1.8nF		2.00±0.30							
2.2nF									
2.7nF	1.60±0.30				1.60±0.30				
3.3nF									
3.9nF									

备注：1、对应产品设计厚度，单位：mm 2、可根据客户的特殊要求设计符合客户需求的产品

Note: 1、Corresponding product design thickness , unit:mm 2、We can design according to customer special requirements

AM12、AM20——“N”端头产品（“N” terminal products）

材料 Dielectric	COG									
	12 (4.5mm*3.2mm)					20 (5.7mm*5.0mm)				
尺寸 Dimensions	250V	500V	1000V	2000V	3000V	250V	500V	1000V	2000V	3000V
电压 Voltage										
1pF										
1.2pF										
1.5pF										
1.8pF										
2.0pF										
2.2pF										
2.7pF										
3.0pF										
3.3pF										
3.6pF										
3.9pF										
4.7pF										
5.0pF										
5.6pF										
6.8pF										
8.0pF				1.6±0.3	1.6±0.30					
8.2pF										
10pF										
12pF	1.6±0.30	1.6±0.30	1.6±0.30							
15pF										
18pF						1.6±0.30	1.6±0.30	1.6±0.30		
22pF										
27pF										
33pF										
39pF										
47pF										
56pF										
68pF										
100pF									2.0±0.30	2.0±0.30
120pF										
150pF										
180pF										
220pF				1.6±0.30	2.0±0.3					
270pF										
330pF										
390pF				1.6±0.30						
470pF										
560pF			1.6±0.30	2.0±0.30						
680pF	1.6±0.30	1.6±0.30								
1nF			2.0±0.30							
1.5nF						1.6±0.30	1.6±0.30	2.0±0.30		
1.8nF	1.6±0.30	1.6±0.30								
2.2nF										
2.7nF										
3.3nF										
3.9nF	1.6±0.30	2.0±0.30								
4.7nF						1.6±0.30	1.6±0.30			
5.6nF	1.6±0.30									
6.8nF										
10nF										
15nF										

备注：1、对应产品设计厚度，单位：mm 2、可根据客户的特殊要求设计符合客户需求的产品

Note: 1、Corresponding product design thickness , unit:mm 2、We can design according to customer special requirements

* II 类电容器具体电压对应容量及厚度情况列表
 A list of the specific voltage-specific capacitors of Class I capacitors

AM01 (0.6mm*0.3mm)

材料 Dielectric	X7R		X7S				X7T				X5R			
	≤25V	50V	≤10V	16V	25V	50V	≤10V	16V	25V	50V	≤10V	16V	25V	50V
120pF														
150pF														
180pF														
220pF														
270pF														
330pF														
390pF														
470pF														
560pF		0.30												0.30
680pF	0.30	±0.03 (N)				0.30			0.30				0.30	±0.03 (N)
1nF	±0.03 (N)					±0.03 (N)			±0.03 (N)				±0.03 (N)	±0.03 (N)
1.2nF														
1.5nF				0.30				0.30						
1.8nF			0.30	±0.03 (N)			0.30	±0.03 (N)			0.30	±0.03 (N)		
2.2nF			±0.03 (N)				±0.03 (N)				±0.03 (N)			
2.7nF														
3.3nF														
3.9nF														
4.7nF														
5.6nF														
6.8nF														
10nF														
12nF														
15nF														
18nF														
22nF														
27nF														
33nF														
39nF														
47nF														
56nF							0.30				0.30			
68nF							±0.05 (N)				±0.05 (N)			
100nF							(N)				(N)			

AM02 (1.0mm*0.5mm) _X5R(85℃)

材料 Dielectric	X5R			
电压 Voltage	6.3V	10V	16V	25V
56nF				
68nF	0.50±0.05 (A)	0.50±0.05 (A)	0.50±0.05 (A)	0.50±0.05 (A)
100nF				
220nF				0.50±0.05 (N)
330nF	0.50±0.05 (N)	0.50±0.05 (N)	0.50±0.05 (N)	
470nF				
680nF				
1μF	0.50±0.15 (N)	0.50±0.15 (N)		

备注： 1、对应产品设计厚度，单位：mm；“(N)”表示 N 端头产品，“(A)”表示 A 端头产品
 2、可根据客户的特殊要求设计符合客户需求的产品

Note: 1、Corresponding product design thickness , unit:mm ;“(N)” N-products “(A)” A-terminal products
 2、We can design according to customer special requirements

AM02 (1.0mm*0.5mm) _X7R (125℃)

材料 Dielectric	X7R					
电压 Voltage	6.3V	10V	16V	25V	50V	100V
120pF	0.50±0.05 (A)	0.50±0.05 (A)	0.50±0.05 (A)	0.50±0.05 (A)	0.50±0.05 (A)	0.50±0.05 (A)
150pF						
180pF						
220pF						
270pF						
330pF						
390pF						
470pF						
560pF						
680pF						
1nF						
1.2nF						
1.5nF						
1.8nF						
2.2nF						
2.7nF						
3.3nF						
3.9nF						
4.7nF						
5.6nF						
6.8nF						
10nF	0.50±0.05 (A)	0.50±0.05 (A)	0.50±0.05 (A)	0.50±0.05 (A)	0.50±0.05 (A)	
12nF						
15nF						
18nF						
22nF						
27nF						
33nF						
39nF						
47nF						

AM02 (1.0mm*0.5mm) _X7S/X7T (125℃)

材料 Dielectric	X7S				X7T	
电压 Voltage	6.3V	10V	16V	25V	6.3V	10V
39nF	0.50±0.05 (A)	0.50±0.05 (A)	0.50±0.05 (A)	0.50±0.05 (A)	0.50±0.05 (A)	0.50±0.05 (A)
47nF						
56nF						
68nF						
100nF						
220nF	0.50±0.05 (N)	0.50±0.05 (N)			0.50±0.05 (N)	0.50±0.05 (N)
330nF						
470nF						
680nF						
1μF						

备注： 1、对应产品设计厚度，单位：mm；“（N）”表示 N 端头产品，“（A）”表示 A 端头产品
 2、可根据客户的特殊要求设计符合客户需求的产品

Note: 1、Corresponding product design thickness , unit:mm ; “(N)” N- terminal products “(A)” A- terminal products
 2、We can design according to customer special requirements

AM03 (1.6mm*0.8mm) _X5R (85℃)

材料 Dielectric	X5R				
电压 Voltage	6.3V	10V	16V	25V	50V
47nF	0.80±0.10 (A)	0.80±0.10 (A)	0.80±0.10 (A)	0.80±0.10 (A)	0.80±0.10 (A)
100nF	0.80±0.10 (N)	0.80±0.10 (N)	0.80±0.10 (N)	0.80±0.10 (N)	0.80±0.10 (N)
220nF					
330nF					
470nF					
680nF					
1μF	0.80±0.20 (N)				
2.2μF					
3.3μF					
4.7μF					

AM03 (1.6mm*0.8mm) _X7R (125℃)

材料 Dielectric	X7R					
电压 Voltage	6.3V	10V	16V	25V	50V	100V
120pF	0.80±0.10 (A)	0.80±0.10 (A)	0.80±0.10 (A)	0.80±0.10 (A)	0.80±0.10 (A)	0.80±0.10 (A)
150pF						
180pF						
220pF						
270pF						
330pF						
390pF						
470pF						
560pF						
680pF						
1nF						
1.2nF						
1.5nF						
1.8nF						
2.2nF						
2.7nF						
3.3nF						
3.9nF						
4.7nF						
5.6nF						
6.8nF						
10nF						
12nF						
15nF						
18nF						
22nF						
27nF						
33nF						
39nF						
47nF						
56nF						
68nF						
100nF	0.80±0.10 (N)	0.80±0.10 (N)	0.80±0.10 (N)	0.80±0.10 (N)	0.80±0.10 (N)	0.80±0.10 (N)
220nF	0.80±0.10 (N)	0.80±0.10 (N)	0.80±0.10 (N)	0.80±0.10 (N)	0.80±0.10 (N)	

备注： 1、对应产品设计厚度，单位：mm；“(N)”表示 N 端头产品，“(A)”表示 A 端头产品
 2、可根据客户的特殊要求设计符合客户需求的产品

Note: 1、Corresponding product design thickness , unit:mm ;”(N)” N- terminal products ”(A)” A- terminal products
 2、We can design according to customer special requirements

AM03 (1.6mm*0.8mm) _X7S/X7T (125℃)

材料 Dielectric	X7S					X7T	
电压 Voltage	6.3V	10V	16V	25V	50V	6.3V	10V
47nF							
56nF	0.80±0.10 (A)	0.80±0.10 (A)	0.80±0.10 (A)	0.80±0.10 (A)	0.80±0.10 (A)	0.80±0.10 (A)	0.80±0.10 (A)
68nF							
100nF					0.80±0.10 (N)		
220nF	0.80±0.10 (N)	0.80±0.10 (N)	0.80±0.10 (N)	0.80±0.10 (N)			
330nF							
470nF						0.80±0.10 (N)	0.80±0.10 (N)
680nF							
1μF	0.80±0.10 (N)	0.80±0.10 (N)	0.80±0.10 (N)				
2.2μF							

AM05 (2.0mm*1.25mm) _X5R (85℃)

材料 Dielectric	X5R					
电压 Voltage	6.3V	10V	16V	25V	50V	100V
56nF						0.80±0.20 (A)
68nF	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	
100nF						1.25±0.20 (N)
220nF	0.80±0.20 (N)	0.80±0.20 (N)	0.80±0.20 (N)	0.80±0.20 (N)	0.80±0.20 (N)	
330nF						
470nF						
680nF					1.25±0.20 (N)	
1μF	1.25±0.20 (N)	1.25±0.20 (N)	1.25±0.20 (N)	1.25±0.20 (N)		
2.2μF						
3.3μF						
4.7μF						
6.8μF						
10μF	1.25±0.20 (N)	1.25±0.20 (N)				

AM05 (2.0mm*1.25mm) _X7R (125℃)

材料 Dielectric	X7R						
电压 Voltage	≤10V	16V	25V	50V	100V	250V	500V
120pF							
150pF							
180pF							
220pF							
270pF							
330pF							
390pF	0.80±0.20(A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)
470pF							
560pF							
680pF							
1nF							
1.2nF							
1.5nF							
1.8nF							

备注： 1、对应产品设计厚度，单位：mm；“（N）”表示 N 端头产品，“（A）”表示 A 端头产品
 2、可根据客户的特殊要求设计符合客户需求的产品

Note: 1、Corresponding product design thickness , unit:mm ; “(N)” N-terminal products “(A)” A-terminal products
 2、We can design according to customer special requirements

AM05 (2.0mm*1.25mm) _X7R (125℃)

材料 Dielectric	X7R						
	≤10V	16V	25V	50V	100V	250V	500V
2.2nF	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)
2.7nF							
3.3nF	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	1.25±0.20 (N)
3.9nF							
4.7nF							
5.6nF							
6.8nF							
10nF	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	1.25±0.20 (N)	
12nF							
15nF							
18nF							
22nF							
27nF							
33nF							
39nF							
47nF							
56nF							
68nF	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	1.25±0.20 (N)		
100nF							
220nF	0.80±0.20 (N)	0.80±0.20 (N)	0.80±0.20 (N)	0.80±0.20 (N)			
330nF							
470nF	1.25±0.20 (N)	1.25±0.20 (N)	1.25±0.20 (N)	1.25±0.20 (N)			
680nF							

AM05 (2.0mm*1.25mm) _X7S/X7T (125℃)

材料 Dielectric	X7S			X7T			
	≤10V	16V	25V	6.3V	10V	16V	25V
56nF	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)	0.80±0.20 (A)
68nF							
100nF							
220nF	0.80±0.20 (N)	0.80±0.20 (N)	0.80±0.20 (N)	0.80±0.20 (N)	0.80±0.20 (N)	0.80±0.20 (N)	0.80±0.20 (N)
330nF							
470nF	1.25±0.20 (N)	1.25±0.20 (N)	1.25±0.20 (N)	1.25±0.20 (N)	1.25±0.20 (N)	1.25±0.20 (N)	1.25±0.20 (N)
680nF							
1μF							
2.2μF							
3.3μF				1.25±0.20 (N)	1.25±0.20 (N)	1.25±0.20 (N)	
4.7μF							
6.8μF				1.25±0.20 (N)			
10μF							

备注： 1、对应产品设计厚度，单位：mm；“(N)”表示 N 端头产品，“(A)”表示 A 端头产品
 2、可根据客户的特殊要求设计符合客户需求的产品

Note: 1、Corresponding product design thickness , unit:mm ;“(N)” N-terminal products “(A)” A-terminal products
 2、We can design according to customer special requirements

AM06(3.2mm*1.6mm)_X5R (85℃)

材料 Dielectric	X5R				
电压 Voltage	6.3V	10V	16V	25V	50V
2.2μF					
3.3μF	1.60±0.30 (N)	1.60±0.30 (N)	1.60±0.30 (N)	1.60±0.30 (N)	1.60±0.30 (N)
4.7μF					
6.8μF					
10μF	1.60±0.30 (N)	1.60±0.30 (N)	1.60±0.30 (N)	1.60±0.30 (N)	
15μF					
22μF	1.60±0.30 (N)	1.60±0.30 (N)			

AM06(3.2mm*1.6mm)_X7R (125℃)

材料 Dielectric	X7R						
电压 Voltage	≤25V	50V	100V	250V	500V	1000V	2000V
120pF							
150pF							
180pF							
220pF							
270pF							
330pF	0.80±0.20(A)	0.80±0.20(A)	0.80±0.20(A)	0.80±0.20(A)	0.80±0.20(A)	0.80±0.20(A)	1.25±0.20(N)
390pF							
470pF							
560pF							
680pF							
1nF							
1.2nF							
1.5nF	0.80±0.20(A)	0.80±0.20(A)	0.80±0.20(A)	0.80±0.20(A)	0.80±0.20(A)	1.25±0.20(N)	
1.8nF							
2.2nF							
2.7nF							
3.3nF	0.80±0.20(A)	0.80±0.20(A)	0.80±0.20(A)	0.80±0.20(A)			
3.9nF							
4.7nF					1.25±0.20(N)	1.25±0.20(N)	
5.6nF							
6.8nF	0.80±0.20(A)	0.80±0.20(A)	0.80±0.20(A)	1.25±0.20(N)			
10nF							
12nF							
15nF							
18nF	0.80±0.20(A)	0.80±0.20(A)	0.80±0.20(A)	1.25±0.20(N)	1.25±0.20(N)		
22nF							
27nF							
33nF							
39nF							
47nF	0.80±0.20(A)	0.80±0.20(A)	0.80±0.20(A)	1.25±0.20(N)			
56nF							
68nF	0.80±0.20(A)	0.80±0.20(A)	1.25±0.20(N)				
100nF							
220nF	0.80±0.20(A)	0.80±0.20(A)	1.25±0.20(N)				
330nF							
470nF	0.80±0.20(N)	0.80±0.20(N)	1.60±0.30(N)				
680nF							
1μF	0.80±0.20(N)	1.60±0.30(N)					
2.2μF		1.60±0.30(N)					
3.3μF	1.60±0.30(N)						
4.7μF							

备注： 1、对应产品设计厚度，单位：mm；
 “(N)”表示 N 端头产品，“(A)”表示 A 端头产品
 2、可根据客户的特殊要求设计符合客户需求的产品
 Note: 1、Corresponding product design thickness , unit:mm ;
 “(N)” N- terminal products
 “(A)” A- terminal products
 2、We can design according to customer special requirements

AM06(3.2mm*1.6mm)_X7S/X7T(125℃)

材料 Dielectric	X7S			X7T			
电压 Voltage	≤25V	50V	100V	6.3V	10V	16V	25V
1μF	0.80±0.20(N)	1.60±0.30(N)	1.60±0.30(N)	0.80±0.20(N)	0.80±0.20(N)	0.80±0.20(N)	0.80±0.20(N)
2.2μF	1.60±0.30(N)	1.60±0.30(N)					
3.3μF	1.60±0.30(N)			1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)
4.7μF							
6.8μF				1.60±0.30(N)	1.60±0.30(N)		
10μF							
22μF				1.60±0.30(N)			

AM10 (3.2mm*2.5mm)_X7R (125℃)

材料 Dielectric	X7R					
电压 Voltage	≤50V	100V	250V	500V	1000V	2000V
120pF	1.25±0.20 (N)	1.25±0.20 (N)	1.25±0.20 (N)	1.25±0.20 (N)	1.25±0.20 (N)	
150pF						
180pF						
220pF						
270pF						
330pF						
390pF						
470pF						
560pF	1.25±0.20(N)	1.25±0.20 (N)	1.25±0.20 (N)	1.25±0.20 (N)	1.25±0.20 (N)	1.25±0.20 (N)
680pF						
1nF						
1.2nF						
1.5nF						
1.8nF						
2.2nF						
3.3nF						
4.7nF						
5.6nF						
6.8nF						1.60±0.30(N)
10nF						2.00±0.30(N)
12nF	1.25±0.20(N)	1.25±0.20(N)	1.25±0.20(N)	1.25±0.20(N)	1.60±0.30(N)	
15nF						
18nF						
22nF						
27nF						
33nF						
39nF	1.25±0.20(N)	1.25±0.20(N)	1.25±0.20(N)	1.60±0.30(N)		
47nF						
56nF						
68nF						
100nF						
220nF						
330nF	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)			
470nF						
680nF						
1μF						
2.2μF						
3.3μF	1.60±0.30(N)					
4.7μF						

备注： 1、对应产品设计厚度，单位：mm；
 “(N)”表示 N 端头产品，“(A)”表示 A 端头产品
 2、可根据客户的特殊要求设计符合客户需求的产品
 Note: 1、Corresponding product design thickness , unit:mm ;
 “(N)” N- terminal products
 “(A)” A- terminal products
 2、We can design according to customer special requirements

AM08 (4.5mm*2.5mm) _X7R (125℃)

材料 Dielectric	X7R				
电压 Voltage	≤250V	500V	1000V	2000V	300V
120pF	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)
150pF					
180pF					
220pF					
270pF					
330pF					
390pF					
470pF					
560pF					
680pF					
1nF					
1.2nF					
1.5nF					
1.8nF					
2.2nF					
3.3nF					
4.7nF					
5.6nF	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)	
6.8nF					
10nF					
12nF	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)		
15nF					
18nF					
22nF					
27nF					
33nF					
39nF	1.60±0.30(N)	1.60±0.30(N)	2.00±0.30(N)		
47nF	1.60±0.30(N)	1.60±0.30(N)			备注： 1、对应产品设计厚度，单位：mm； “(N)”表示 N 端头产品，“(A)”表示 A 端头产品 2、可根据客户的特殊要求设计符合客户需求的产品 Note: 1、Corresponding product design thickness , unit:mm ; “(N)” N- terminal products “(A)” A- terminal products 2、We can design according to customer special requirements
56nF	1.60±0.30(N)	1.60±0.30(N)			
68nF					
100nF	1.60±0.30(N)				
220nF	1.60±0.30(N)				
330nF					
470nF					
680nF					

AM12 (4.5mm*3.2mm) _X7R (125℃)

材料 Dielectric	X7R				
电压 Voltage	≤250V	500V	1000V	2000V	300V
120pF	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)
150pF					
180pF					
220pF					
270pF					
330pF					
390pF					
470pF					
560pF					
680pF					
1nF					
1.2nF					
1.5nF					
1.8nF					

AM12 (4.5mm*3.2mm) _X7R (125℃)

材料 Dielectric	X7R				
电压 Voltage	≤250V	500V	1000V	2000V	300V
2.2nF	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)
3.3nF					
4.7nF					
5.6nF					
6.8nF	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)		
10nF					
12nF					
15nF					
18nF					
22nF					
27nF					
33nF	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)		
39nF					
47nF					
56nF					
68nF	1.60±0.30(N)	1.60±0.30(N)	2.00±0.30(N)		
100nF	1.60±0.30(N)	2.50±0.30(N)			
220nF	1.60±0.30(N)				
330nF	2.00±0.30(N)				
470nF					
680nF					
1μF					

备注： 1、对应产品设计厚度，单位：mm；
 “(N)”表示 N 端头产品，“(A)”表示 A 端头产品
 2、可根据客户的特殊要求设计符合客户需求的产品
 Note: 1、Corresponding product design thickness , unit:mm ;
 “(N)” N- terminal products “(A)” A- terminal products
 2、We can design according to customer special requirements

AM20 (5.7mm*5.0mm) _X7R (125℃)

材料 Dielectric	X7R				
电压 Voltage	≤250V	500V	1000V	2000V	300V
1nF	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)
1.2nF					
1.5nF					
1.8nF					
2.2nF					
3.3nF					
4.7nF					
5.6nF					
6.8nF	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)
10nF					
15nF					
18nF					
22nF					
27nF					
33nF					
39nF					
47nF					
56nF					
100nF	1.60±0.30(N)	1.60±0.30(N)	1.60±0.30(N)	1.80±0.30(N)	
220nF					
330nF					
470nF					
1μF	2.00±0.30(N)				

备注： 1、对应产品设计厚度，单位：mm；“(N)”表示 N 端头产品，“(A)”表示 A 端头产品
 2、可根据客户的特殊要求设计符合客户需求的产品

Note: 1、Corresponding product design thickness , unit:mm ;“(N)” N- terminal products “(A)” A- terminal products
 2、We can design according to customer special requirements

◆ 可靠性试验
Reliability Test

序号 NO.	项目 Item	技术规格 Technical Specification				测试方法 Test Method and Remarks				
		I类 Class I	应符合指定的误差级别 Should be within the specified tolerance.			标称容量 Capacitance	测试频率 Measuring Frequency	测试电压 Measuring Voltage		
1	容量 Capacitance	I类 Class I	应符合指定的误差级别 Should be within the specified tolerance.			≤1000pF	1MHz±10%	1.0±0.2Vrms		
		II类 Class II	应符合指定的误差级别 Should be within the specified tolerance.			>1000 pF	1KHz±10%			
2	损耗角正切 (DF, tanδ) Dissipation Factor	I类 Class I	DF	容量 Capacitance		测试频率: 1MHz±10%				
		II类 Class II	≤0.1%	Cr≥30pF	测试电压: 1.0±0.2Vrms					
2	损耗角正切 (DF, tanδ) Dissipation Factor	II类 Class II	电压 Voltage	DF	AM01	AM02	AM03	AM05	≥AM06	C≤10μF 测试频率: 1KHz±10% 测试电压: 1.0±0.2Vrms Test Frequency: 1KHz±10% Test Voltage: 1.0±0.2Vrms
			≥100V	≤5.0%	—	≤10nF	≤100nF	≤330nF	≤680nF	
2	损耗角正切 (DF, tanδ) Dissipation Factor	II类 Class II	50V	≤2.5%	≤3.3nF	≤10nF	≤100nF	≤330nF	≤680nF	C≤10μF 测试频率: 1KHz±10% 测试电压: 1.0±0.2Vrms Test Frequency: 1KHz±10% Test Voltage: 1.0±0.2Vrms
				≤3.5%	≤10nF	—	—	—	≤1μF	
2	损耗角正切 (DF, tanδ) Dissipation Factor	II类 Class II	25V	≤5.0%	—	—	—	≤680nF	—	C≤10μF 测试频率: 1KHz±10% 测试电压: 1.0±0.2Vrms Test Frequency: 1KHz±10% Test Voltage: 1.0±0.2Vrms
				≤10%	—	≤1μF	≤2.2μF	≤4.7μF	≤10μF	
2	损耗角正切 (DF, tanδ) Dissipation Factor	II类 Class II	16V	≤2.5%	≤3.3nF	≤10nF	≤150nF	≤330nF	≤680nF	C>10μF 测试频率: 120±24 Hz 测试电压: 0.5±0.1Vrms Test Frequency: 120±24 Hz Test Voltage: 0.5±0.1Vrms
				≤3.5%	≤15nF	≤100nF	≤330nF	—	≤2.2μF	
2	损耗角正切 (DF, tanδ) Dissipation Factor	II类 Class II	≤10V	≤5.0%	—	≤220nF	≤680nF	≤2.2μF	—	C>10μF 测试频率: 120±24 Hz 测试电压: 0.5±0.1Vrms Test Frequency: 120±24 Hz Test Voltage: 0.5±0.1Vrms
				≤7.5%	—	—	—	≤4.7μF	≤10μF	
2	损耗角正切 (DF, tanδ) Dissipation Factor	II类 Class II	≤10V	≤10%	≤100nF	≤1μF	≤2.2μF	≤10μF	≤22μF	C>10μF 测试频率: 120±24 Hz 测试电压: 0.5±0.1Vrms Test Frequency: 120±24 Hz Test Voltage: 0.5±0.1Vrms
				≤10%	≤100nF	≤1μF	≤2.2μF	≤10μF	≤22μF	

序号 NO.	项目 Item	技术规格 Technical Specification	测试方法 Test Method and Remarks												
3	绝缘电阻 (IR) Insulation Resistance	<table border="1"> <tr> <td>I类 Class I</td> <td>$C \leq 10 \text{ nF}$, $R_i \geq 50000 \text{ M}\Omega$</td> </tr> <tr> <td>II类 Class II</td> <td>$C \leq 25 \text{ nF}$, $R_i \geq 10000 \text{ M}\Omega$</td> </tr> <tr> <td></td> <td>$C > 10 \text{ nF}$, $R_i \cdot C_R \geq 500 \text{ S}$</td> </tr> <tr> <td></td> <td>$C > 25 \text{ nF}$, $R_i \cdot C_R \geq 100 \text{ S}$</td> </tr> </table>	I类 Class I	$C \leq 10 \text{ nF}$, $R_i \geq 50000 \text{ M}\Omega$	II类 Class II	$C \leq 25 \text{ nF}$, $R_i \geq 10000 \text{ M}\Omega$		$C > 10 \text{ nF}$, $R_i \cdot C_R \geq 500 \text{ S}$		$C > 25 \text{ nF}$, $R_i \cdot C_R \geq 100 \text{ S}$	测试电压: 额定电压 (最高 500V) 测试时间: 60 ± 5 秒 测试湿度: $\leq 75\%$ 测试温度: $25^\circ\text{C} \pm 3^\circ\text{C}$ 测试充放电电流: $\leq 50 \text{ mA}$ Measuring Voltage: Rated Voltage (Max 500V) Duration: $60 \pm 5 \text{ s}$ Test Humidity: $\leq 75\%$ Test Temperature: $25^\circ\text{C} \pm 3^\circ\text{C}$ Test Current: $\leq 50 \text{ mA}$				
I类 Class I	$C \leq 10 \text{ nF}$, $R_i \geq 50000 \text{ M}\Omega$														
II类 Class II	$C \leq 25 \text{ nF}$, $R_i \geq 10000 \text{ M}\Omega$														
	$C > 10 \text{ nF}$, $R_i \cdot C_R \geq 500 \text{ S}$														
	$C > 25 \text{ nF}$, $R_i \cdot C_R \geq 100 \text{ S}$														
4	介质耐电强度 (DW) Dielectric Withstanding Voltage	不应有介质被击穿或损伤 No breakdown or damage.	<table border="1"> <tr> <td>$U_r < 100 \text{ V}$</td> <td> 测量电压: I类: $300\% U_r$ II类: $250\% U_r$ 时间: 1~5 秒 充/放电电流: 不应超过 50mA Measuring Voltage: I class: $300\% U_r$ II class: $250\% U_r$ Duration: 1~5s Charge/ Discharge Current: 50mA max. </td> </tr> <tr> <td>$100 \text{ V} \leq U_r < 500 \text{ V}$</td> <td> 施加额定电压的 200%, 5 秒, 最大电流不超过 50mA Force 200% Rated voltage for 5 second. Max. current should not exceed 50 mA. </td> </tr> <tr> <td>$500 \text{ V} \leq U_r \leq 1000 \text{ V}$</td> <td> 施加额定电压的 150%, 5 秒, 最大电流不超过 50mA Force 150% Rated voltage for 5 second. Max. current should not exceed 50 mA. </td> </tr> <tr> <td>$1000 \text{ V} < U_r \leq 2000 \text{ V}$</td> <td> 施加额定电压的 120%, 5 秒, 最大电流不超过 50mA Force 120% Rated voltage for 5 seconds. Max. current should not exceed 50 mA. </td> </tr> <tr> <td>$U_r > 2000 \text{ V}$</td> <td> 施加额定电压的 120%, 5 秒, 最大电流不超过 10mA Force 120% Rated voltage for 5 seconds. Max. current should not exceed 10 mA. </td> </tr> </table>	$U_r < 100 \text{ V}$	测量电压: I类: $300\% U_r$ II类: $250\% U_r$ 时间: 1~5 秒 充/放电电流: 不应超过 50mA Measuring Voltage: I class: $300\% U_r$ II class: $250\% U_r$ Duration: 1~5s Charge/ Discharge Current: 50mA max.	$100 \text{ V} \leq U_r < 500 \text{ V}$	施加额定电压的 200%, 5 秒, 最大电流不超过 50mA Force 200% Rated voltage for 5 second. Max. current should not exceed 50 mA.	$500 \text{ V} \leq U_r \leq 1000 \text{ V}$	施加额定电压的 150%, 5 秒, 最大电流不超过 50mA Force 150% Rated voltage for 5 second. Max. current should not exceed 50 mA.	$1000 \text{ V} < U_r \leq 2000 \text{ V}$	施加额定电压的 120%, 5 秒, 最大电流不超过 50mA Force 120% Rated voltage for 5 seconds. Max. current should not exceed 50 mA.	$U_r > 2000 \text{ V}$	施加额定电压的 120%, 5 秒, 最大电流不超过 10mA Force 120% Rated voltage for 5 seconds. Max. current should not exceed 10 mA.		
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5	外观 Appearance	无可见损伤 No visible damage	目视检查 Visual inspection												
6	尺寸 Physical Dimension	在规定尺寸范围内 Within the specified dimensions	使用卡尺 Use caliper												
7	破坏性物理分析 DPA	无缺陷或异常 No defects or abnormalities	按照 EIA-469 Accounting to EIA-469												
8	高温存储 High Temperature Exposure	<table border="1"> <tr> <th>项目 Item</th> <th>I类 Class I</th> <th>II类 Class II</th> </tr> <tr> <td>$\Delta C/C$</td> <td>$\leq \pm 1\%$ 或 $\pm 1 \text{ pF}$, 取两者中最大者 $\leq \pm 1\%$ or $\pm 1 \text{ pF}$, whichever is larger.</td> <td>$-10\% \sim +10\%$</td> </tr> <tr> <td>DF</td> <td colspan="2">同初始标准 Same to initial value.</td> </tr> <tr> <td>IR</td> <td colspan="2">同初始标准 Same to initial value.</td> </tr> </table>	项目 Item	I类 Class I	II类 Class II	$\Delta C/C$	$\leq \pm 1\%$ 或 $\pm 1 \text{ pF}$, 取两者中最大者 $\leq \pm 1\%$ or $\pm 1 \text{ pF}$, whichever is larger.	$-10\% \sim +10\%$	DF	同初始标准 Same to initial value.		IR	同初始标准 Same to initial value.		温度: 125°C 实验电压: 不施加电压 实验时间: 1000 小时 放置条件: 室温 放置时间: 24 小时 (I类); 48 小时 (II类) Temperature: 125°C Voltage: without Duration: 1000h Recovery conditions: Room temperature Recovery Time: 24h (Class1) or 48h (Class2)
项目 Item	I类 Class I	II类 Class II													
$\Delta C/C$	$\leq \pm 1\%$ 或 $\pm 1 \text{ pF}$, 取两者中最大者 $\leq \pm 1\%$ or $\pm 1 \text{ pF}$, whichever is larger.	$-10\% \sim +10\%$													
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序号 NO.	项目 Item	技术规格 Technical Specification			测试方法 Test Method and Remarks													
9	温度冲击 Temperature shock	项目 Item	I类 Class I	II类 Class II	※预处理*（仅针对2类电容器）：上限类别温度，1小时；恢复：24±1h 初始测量 循环次数：1000次 试验方法： 1、样品上板后放置入温冲箱内 2、温度区间为-55℃~上限温度，每个温度点停留时间15min，温区间转换时间<10s 试验后放置（恢复）时间：24±2h ※Preheating conditions(Only for Class II): up-category temperature, 1h Recovery time: 24±1h Initial Measurement. Cycling Times: 1000 times Test method: 1.The sample is placed on the plate and placed in the warm flushing box. 2.The temperature range is -55℃ ~ upper limit temperature, the residence time of each temperature point is 15min, and the temperature interval conversion time is <10s.													
ΔC/C	≤±1%或±1pF，取两者中最大者 ≤±1% or ±1pF, whichever is larger.	-10%~+10%																
DF	同初始标准 Same to initial value.																	
IR	同初始标准 Same to initial value.																	
外观：无可见损伤 Appearance: No visible damage																		
10	温度循环 Temperature Cycle	项目 Item	I类 Class I	II类 Class II	※预处理*（仅针对2类电容器）：上限类别温度，1小时；恢复：24±1h 初始测量 循环次数：1000次,一个循环分以下4步： 试验后放置（恢复）时间：24±2h ※Preheating conditions(Only for Class II): up-category temperature, 1h Recovery time: 24±1h. Cycling Times: 1000 times. A cycle is divided into the following 4 steps: Recovery time after test: 24±2h													
ΔC/C	≤±1%或±1pF，取两者中最大者 ≤±1% or ±1pF, whichever is larger.	-10%~+10%																
DF	同初始标准 Same to initial value.																	
IR	同初始标准 Same to initial value.																	
外观：无可见损伤 Appearance: No visible damage																		
			<table border="1"> <thead> <tr> <th>步骤 Step</th> <th>温度(℃) Temperature (℃)</th> <th>时间(分钟) Time (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>下限温度(Low-category Temp.): -55</td> <td>30</td> </tr> <tr> <td>2</td> <td>常温(Normal temp.): +20</td> <td>1</td> </tr> <tr> <td>3</td> <td>上限温度(Up-category Temp.): C0G/X7R/X7S/X7T: +125 X5R: +85</td> <td>30</td> </tr> <tr> <td>4</td> <td>常温(Normal temp.): +20</td> <td>1</td> </tr> </tbody> </table>	步骤 Step	温度(℃) Temperature (℃)	时间(分钟) Time (min)	1	下限温度(Low-category Temp.): -55	30	2	常温(Normal temp.): +20	1	3	上限温度(Up-category Temp.): C0G/X7R/X7S/X7T: +125 X5R: +85	30	4	常温(Normal temp.): +20	1
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4	常温(Normal temp.): +20	1																
11	偏高湿度 High humidity	项目 Item	I类 Class I	II类 Class II	※预处理（仅针对2类电容器）： 在140℃~150℃下预热1小时后，在室温下放置24小时。 试验条件：85±2℃，80~85%R.H. 串联一个100KΩ，施加额定电压，1000小时 ※Preheating conditions(Only for Class II): Preheat at 140 °C~ 150 °C for 1 hour. And recovery time: 24±1h. Test method: 85±2℃，80~85%R.H, A 100KΩ in series, rated voltage applied, 1000 hours													
ΔC/C	≤±2.5%或±2.5pF，取两者之中较大者。 ≤±2.5% or ±2.5pF, whichever is larger.	-12.5%~+12.5%																
DF	同初始标准 Same to initial value.																	
IR	同初始标准 Same to initial value.																	
外观：无可见损伤 Appearance: No visible damage																		

注解：

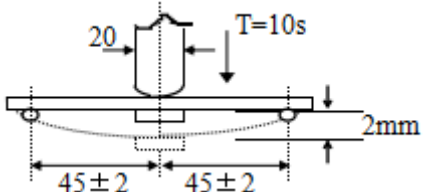
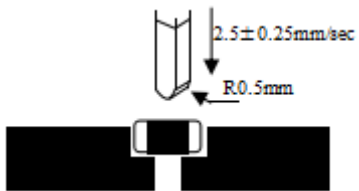
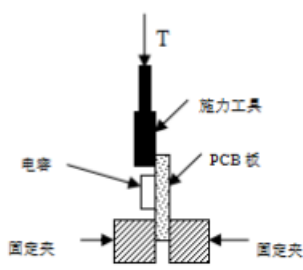
专门预处理*（仅对2类电容器）：

将电容器放在上限类别温度或按详细规范中可能规定的更高温度下经1h后，接着在试验的标准大气条件下恢复24±1h。

Note:

Preheating: (only for class2 capacitor) is a method to treat the capacitor before measurement. First, place the capacitor in the up-category temperature or other specified higher temperature environment for 1hour. Then recovery the capacitor at standard pressure conditions for 24±1hours.

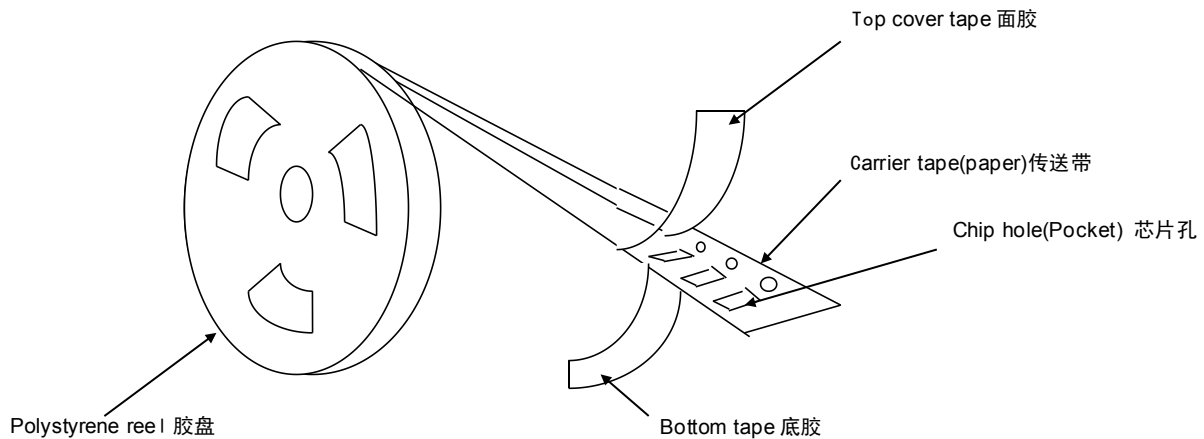
序号 NO.	项目 Item	技术规格 Technical Specification	测试方法 Test Method and Remarks															
12	寿命试验 Life test	<table border="1"> <tr> <td>ΔC/C</td> <td> I类: $\leq \pm 2.5\%$ 或 $\pm 2.5\text{pF}$ 取两者之中较大者 II类: $\leq \pm 12.5\%$ Class I: $\leq \pm 2.5\%$ or $\pm 2.5\text{pF}$, whichever is larger. Class II: $\leq \pm 12.5\%$ </td> </tr> <tr> <td>DF</td> <td>同初始标准 Same to initial value.</td> </tr> <tr> <td rowspan="2">IR</td> <td> I类: $R_i \geq 5000\text{M}\Omega$ 或 $R_i \cdot C_R \geq 50\text{S}$ 取两者之中较小者. Class I: $R_i \geq 5000\text{M}\Omega$ or $R_i \cdot C_R \geq 50\text{S}$, whichever is smaller. </td> </tr> <tr> <td> II类: $R_i \geq 1000\text{M}\Omega$ 或 $R_i \cdot C_R \geq 10\text{S}$ 取两者之中较小者. Class II: $R_i \geq 1000\text{M}\Omega$ or $R_i \cdot C_R \geq 10\text{S}$, whichever is smaller. </td> </tr> <tr> <td colspan="2">外观: 无可见损伤 Appearance: No visible damage</td> </tr> </table>	ΔC/C	I类: $\leq \pm 2.5\%$ 或 $\pm 2.5\text{pF}$ 取两者之中较大者 II类: $\leq \pm 12.5\%$ Class I: $\leq \pm 2.5\%$ or $\pm 2.5\text{pF}$, whichever is larger. Class II: $\leq \pm 12.5\%$	DF	同初始标准 Same to initial value.	IR	I类: $R_i \geq 5000\text{M}\Omega$ 或 $R_i \cdot C_R \geq 50\text{S}$ 取两者之中较小者. Class I: $R_i \geq 5000\text{M}\Omega$ or $R_i \cdot C_R \geq 50\text{S}$, whichever is smaller.	II类: $R_i \geq 1000\text{M}\Omega$ 或 $R_i \cdot C_R \geq 10\text{S}$ 取两者之中较小者. Class II: $R_i \geq 1000\text{M}\Omega$ or $R_i \cdot C_R \geq 10\text{S}$, whichever is smaller.	外观: 无可见损伤 Appearance: No visible damage		电压: $U_r < 500\text{V}$: 2 倍额定电压 $500\text{V} \leq U_r \leq 630\text{V}$: 1.5 倍额定电压 $U_r > 630\text{V}$: 1 倍额定电压 时间: 1000 小时 温度: 125°C 充电电流: 不应超过 50mA 放置条件: 室温 放置时间: 24 小时 (I 类), 或 48 小时 (II 类)。 Applied Voltage: $U_r < 500\text{V}$: $2 \times \text{Rated Voltage}$ $500\text{V} \leq U_r \leq 630\text{V}$: $1.5 \times \text{Rated Voltage}$ $U_r > 630\text{V}$: $1 \times \text{Rated Voltage}$ Duration: 1000h Temperature: 125°C Charge/ Discharge Current: 50mA max. Recovery Conditions: Room Temperature Recovery Time: 24h (I class), or 48h (II class)						
ΔC/C	I类: $\leq \pm 2.5\%$ 或 $\pm 2.5\text{pF}$ 取两者之中较大者 II类: $\leq \pm 12.5\%$ Class I: $\leq \pm 2.5\%$ or $\pm 2.5\text{pF}$, whichever is larger. Class II: $\leq \pm 12.5\%$																	
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外观: 无可见损伤 Appearance: No visible damage																		
13	可焊性 Soderability	上锡率应大于 95% 外观: 无可见损伤。 At least 95% of the terminal electrode is covered by new solder. Visual Appearance: No visible damage.	将电容在 $80 \sim 120^\circ\text{C}$ 的温度下预热 10~30 秒。 Preheating conditions: 80 to 120°C ; 10~30s. <table border="1"> <tr> <td>有铅焊料: (Sn/Pb: 63/37)</td> <td>无铅焊料:</td> </tr> <tr> <td>浸锡温度: $235 \pm 5^\circ\text{C}$</td> <td>浸锡温度: $245 \pm 5^\circ\text{C}$</td> </tr> <tr> <td>浸锡时间: $2 \pm 0.5\text{s}$</td> <td>浸锡时间: $3 \pm 0.3\text{s}$</td> </tr> <tr> <td>Solder Temperature: $235 \pm 5^\circ\text{C}$</td> <td>Solder Temperature: $245 \pm 5^\circ\text{C}$</td> </tr> <tr> <td>Duration: $2 \pm 0.5\text{s}$</td> <td>Duration: $3 \pm 0.3\text{s}$</td> </tr> </table>	有铅焊料: (Sn/Pb: 63/37)	无铅焊料:	浸锡温度: $235 \pm 5^\circ\text{C}$	浸锡温度: $245 \pm 5^\circ\text{C}$	浸锡时间: $2 \pm 0.5\text{s}$	浸锡时间: $3 \pm 0.3\text{s}$	Solder Temperature: $235 \pm 5^\circ\text{C}$	Solder Temperature: $245 \pm 5^\circ\text{C}$	Duration: $2 \pm 0.5\text{s}$	Duration: $3 \pm 0.3\text{s}$					
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14	耐焊接热 Resistance to Soldering Heat	<table border="1"> <thead> <tr> <th>项目 Item</th> <th>I 类 Class I</th> <th>II 类 Class II</th> </tr> </thead> <tbody> <tr> <td>ΔC/C</td> <td> $\leq \pm 1\%$ 或 $\pm 1\text{pF}$, 取两者之中较大者。 $\leq \pm 1\%$ or $\pm 1\text{pF}$, whichever is larger. </td> <td>-5%~+10%</td> </tr> <tr> <td>DF</td> <td colspan="2">同初始标准 Same to initial value.</td> </tr> <tr> <td>IR</td> <td colspan="2">同初始标准 Same to initial value.</td> </tr> <tr> <td colspan="3">外观: 无可见损伤 上锡率: $\geq 95\%$ Appearance: No visible damage. At least 95% of the terminal electrode is covered by new solder.</td> </tr> </tbody> </table>	项目 Item	I 类 Class I	II 类 Class II	ΔC/C	$\leq \pm 1\%$ 或 $\pm 1\text{pF}$, 取两者之中较大者。 $\leq \pm 1\%$ or $\pm 1\text{pF}$, whichever is larger.	-5%~+10%	DF	同初始标准 Same to initial value.		IR	同初始标准 Same to initial value.		外观: 无可见损伤 上锡率: $\geq 95\%$ Appearance: No visible damage. At least 95% of the terminal electrode is covered by new solder.			将电容在 $100 \sim 200^\circ\text{C}$ 的温度下预热 60~120 秒。 浸锡温度: $265 \pm 5^\circ\text{C}$ 浸锡时间: $10 \pm 1\text{s}$ 然后取出溶剂清洗干净, 在 10 倍以上的显微镜底下观察。 放置时间: 24 ± 2 小时 放置条件: 室温 Preheating conditions: 100 to 200°C ; 60~120s. Solder Temperature: $265 \pm 5^\circ\text{C}$ Duration: $10 \pm 1\text{s}$ Clean the capacitor with solvent and examine it with a 10X(min.) microscope. Recovery Time: $24 \pm 2\text{h}$ Recovery condition: Room temperature
项目 Item	I 类 Class I	II 类 Class II																
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IR	同初始标准 Same to initial value.																	
外观: 无可见损伤 上锡率: $\geq 95\%$ Appearance: No visible damage. At least 95% of the terminal electrode is covered by new solder.																		
15	静电放电 ESD	<table border="1"> <thead> <tr> <th>项目 Item</th> <th>I 类 Class I</th> <th>II 类 Class II</th> </tr> </thead> <tbody> <tr> <td>ΔC/C</td> <td colspan="2">同初始标准 Same to initial value.</td> </tr> <tr> <td>DF</td> <td colspan="2">同初始标准 Same to initial value.</td> </tr> <tr> <td>IR</td> <td colspan="2">同初始标准 Same to initial value.</td> </tr> <tr> <td colspan="3">外观: 无可见损伤 Appearance: No visible damage</td> </tr> </tbody> </table>	项目 Item	I 类 Class I	II 类 Class II	ΔC/C	同初始标准 Same to initial value.		DF	同初始标准 Same to initial value.		IR	同初始标准 Same to initial value.		外观: 无可见损伤 Appearance: No visible damage			参照 AEC-Q200-002 方法进行 ESD 静电放电试验; 放电电压: $2\text{kV} \sim 22\text{kV}$ 按 2kV 步进测试。 每个样品每个电极承受两次放电, 正、负级性各 1 次; 样品经过指定等级的电压后符合验收标准要求, 则使用原样品进入下一个电压应力等级试验。 ESD electrostatic discharge test was carried out according to AEC-Q200-002 method: Discharge voltage: $2\text{kV} \sim 22\text{kV}$ according to 2kV step test. Each sample is subjected to two discharges per electrode, one positive and one negative grade. After the sample meets the requirements of the acceptance criteria after passing the specified level of voltage, the original sample is used to enter the next voltage stress level test
项目 Item	I 类 Class I	II 类 Class II																
ΔC/C	同初始标准 Same to initial value.																	
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序号 NO.	项目 Item	技术规格 Technical Specification	测试方法 Test Method and Remarks																				
16	抗弯曲强度 Bending Strength	<table border="1"> <thead> <tr> <th>项目 Item</th> <th>I类 Class I</th> <th>II类 Class II</th> </tr> </thead> <tbody> <tr> <td>$\Delta C/C$</td> <td>$\leq \pm 1\%$ 或 $\pm 1pF$, 取两者之中较大者。 $\leq \pm 1\%$ or $\pm 1pF$, whichever is larger.</td> <td>-10%~+10%</td> </tr> <tr> <td>DF</td> <td colspan="2">同初始标准 Same to initial value.</td> </tr> <tr> <td>IR</td> <td colspan="2">同初始标准 Same to initial value.</td> </tr> </tbody> </table> <p>外观：无可见损伤 Appearance: No visible damage</p>	项目 Item	I类 Class I	II类 Class II	$\Delta C/C$	$\leq \pm 1\%$ 或 $\pm 1pF$, 取两者之中较大者。 $\leq \pm 1\%$ or $\pm 1pF$, whichever is larger.	-10%~+10%	DF	同初始标准 Same to initial value.		IR	同初始标准 Same to initial value.		<p>试验基板：Al₂O₃ 或 PCB 弯曲深度：2mm 施压速度：1mm/sec.; 单位：mm 应在弯曲状态下进行测量 Test Board: Al₂O₃ or PCB Warp: 2mm Speed: 1mm/sec. Unit: mm The measurement should be made with the board in the bending position.</p> 								
项目 Item	I类 Class I	II类 Class II																					
$\Delta C/C$	$\leq \pm 1\%$ 或 $\pm 1pF$, 取两者之中较大者。 $\leq \pm 1\%$ or $\pm 1pF$, whichever is larger.	-10%~+10%																					
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IR	同初始标准 Same to initial value.																						
17	射束负载 (断裂强度) Beam load (breaking strength)	<table border="1"> <thead> <tr> <th>规格 Type</th> <th>产品厚度 Product thickness</th> <th>最小受力 Min force</th> </tr> </thead> <tbody> <tr> <td rowspan="2">$\leq AM05$</td> <td>> 0.5mm</td> <td>20N</td> </tr> <tr> <td>$\leq 0.5mm$</td> <td>8N</td> </tr> <tr> <td rowspan="2">$\geq AM06$</td> <td>$\geq 1.25mm$</td> <td>54N</td> </tr> <tr> <td>< 1.25mm</td> <td>15N</td> </tr> </tbody> </table>	规格 Type	产品厚度 Product thickness	最小受力 Min force	$\leq AM05$	> 0.5mm	20N	$\leq 0.5mm$	8N	$\geq AM06$	$\geq 1.25mm$	54N	< 1.25mm	15N	<p>如图所示 产品在测试过程中瓷体断裂时所受力必须大于最小承受力。 As shown in the picture The force on the porcelain body when the product breaks during the test must be greater than the minimum bearing force.</p> 							
规格 Type	产品厚度 Product thickness	最小受力 Min force																					
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	$\leq 0.5mm$	8N																					
$\geq AM06$	$\geq 1.25mm$	54N																					
	< 1.25mm	15N																					
18	端子强度 (SMD) Terminal strength	<table border="1"> <thead> <tr> <th>项目 Item</th> <th>I类 Class I</th> <th>II类 Class II</th> </tr> </thead> <tbody> <tr> <td>$\Delta C/C$</td> <td>$\leq \pm 0.5\%$</td> <td>-10%~+10%</td> </tr> <tr> <td>DF</td> <td colspan="2">同初始标准 Same to initial value.</td> </tr> <tr> <td>IR</td> <td colspan="2">同初始标准 Same to initial value.</td> </tr> </tbody> </table> <p>外观：无可见损伤 Appearance: No visible damage</p>	项目 Item	I类 Class I	II类 Class II	$\Delta C/C$	$\leq \pm 0.5\%$	-10%~+10%	DF	同初始标准 Same to initial value.		IR	同初始标准 Same to initial value.		<p>如图所示 慢慢施加一个 T 的力到电容侧面瓷体上，并保持 60+1 秒。 As shown in the picture Slowly apply a T force to the porcelain body on the side of the capacitor and hold for 60+1 seconds.</p> <table border="1"> <thead> <tr> <th>规格</th> <th>施加力 T</th> </tr> </thead> <tbody> <tr> <td>$\leq AM02$</td> <td>2N</td> </tr> <tr> <td>AM03</td> <td>10N</td> </tr> <tr> <td>$> AM03$</td> <td>17.7N</td> </tr> </tbody> </table> 	规格	施加力 T	$\leq AM02$	2N	AM03	10N	$> AM03$	17.7N
项目 Item	I类 Class I	II类 Class II																					
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19	温度特性 Temperature characteristics	<table border="1"> <thead> <tr> <th>项目 Item</th> <th>$\Delta C/C$</th> </tr> </thead> <tbody> <tr> <td>C0G</td> <td>$\pm 0.2\%$ 或 $\pm 0.05pF$</td> </tr> <tr> <td>X7R</td> <td>$\pm 15\%$</td> </tr> <tr> <td>X7S</td> <td>$\pm 22\%$</td> </tr> <tr> <td>X7T</td> <td>-33%~+22%</td> </tr> </tbody> </table>	项目 Item	$\Delta C/C$	C0G	$\pm 0.2\%$ 或 $\pm 0.05pF$	X7R	$\pm 15\%$	X7S	$\pm 22\%$	X7T	-33%~+22%	<p>在 -55℃、20℃、125℃ 三个温度点分别测量产品电性能 The electrical properties of the product are measured at three temperature points of -55℃, 20℃ and 125℃</p>										
项目 Item	$\Delta C/C$																						
C0G	$\pm 0.2\%$ 或 $\pm 0.05pF$																						
X7R	$\pm 15\%$																						
X7S	$\pm 22\%$																						
X7T	-33%~+22%																						

序号 NO.	项目 Item	技术规格 Technical Specification			测试方法 Test Method and Remarks
20	振动 Vibration	项目 Item	I 类 Class I	II 类 Class II	5g 的力 20 分钟，三个方向每个方向 12 个循环。 注意：使用 8"X5" 印刷线路板，.031"厚，在长的一边有 7 个固定点，在对面的边的角有 2 个固定点。产品在距离固定点 2" 内安装。测试频率从 10-2000 赫兹。 The force of 5g is 20 minutes, and there are 12 cycles in each direction in three directions. Note: Use an 8"X5" PCB board, .031" thick, with 7 fixing points on the long side and 2 fixing points at the corners of the opposite side. The product is installed within 2" of the fixed point. Test frequency from 10-2000 Hz.
		$\Delta C/C$	$\leq \pm 1\%$ 或 $\pm 1pF$, 取两者之中较大者。 $\leq \pm 1\%$ or $\pm 1pF$, whichever is larger.	-10%~+10%	
		DF	同初始标准 Same to initial value.		
		IR	同初始标准 Same to initial value.		
		外观：无可见损伤 Appearance: No visible damage			
21	机械冲击 Mechanical shock	项目 Item	I 类 Class I	II 类 Class II	应沿试件的 3 个互相垂直轴，在每个方向上实施 3 次冲击试验 (共计 18 次冲击)。 脉冲波形：正弦半波 持续时长：0.5 毫秒 峰值：1500g 速度变化：4.7m/s Three impact tests (18 shocks in total) should be performed in each direction along the three perpendicular axes of the specimen. Pulse waveform: sinusoidal half-wave Duration: 0.5 ms Peak: 1500g Speed change: 4.7m/s
		$\Delta C/C$	$\leq \pm 1\%$ 或 $\pm 1pF$, 取两者之中较大者。 $\leq \pm 1\%$ or $\pm 1pF$, whichever is larger.	-10%~+10%	
		DF	同初始标准 Same to initial value.		
		IR	同初始标准 Same to initial value.		
		外观：无可见损伤 Appearance: No visible damage			

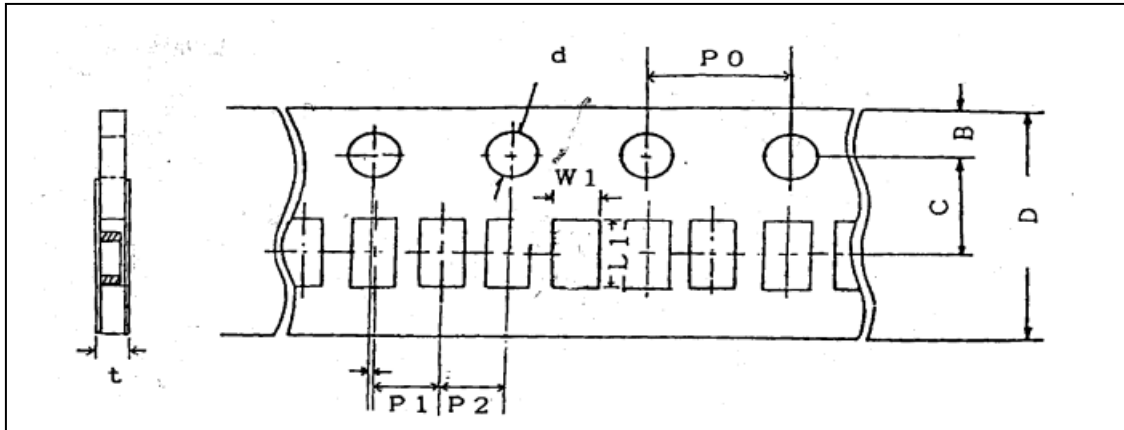
◆ 包装
Package

- * 纸带卷盘结构
Paper Taping



* AM01、AM02 纸带编带尺寸大小

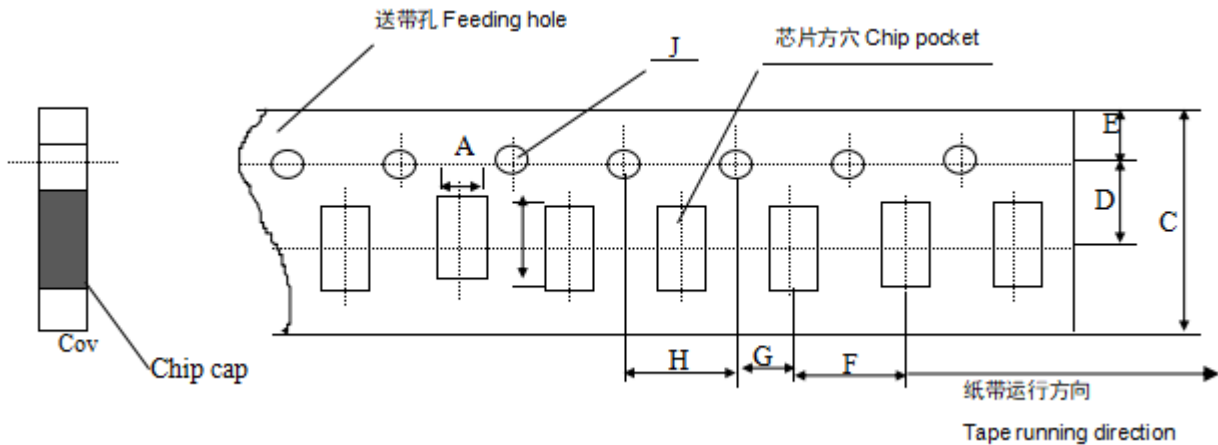
Dimensions of paper taping for AM01、AM02 type



代号 Code	W1	L1	D	C	B	P1	P2	P0	d	t
AM01	0.37± 0.10	0.67± 0.10	8.00± 0.10	3.50± 0.05	1.75± 0.10	2.00± 0.05	2.00± 0.05	4.00± 0.10	1.50 -0/+0.10	0.80 Below
AM02	0.65± 0.10	1.15± 0.10	8.00± 0.10	3.50± 0.05	1.75± 0.10	2.00± 0.05	2.00± 0.05	4.00± 0.10	1.50 -0/+0.10	0.80 Below

* 适合 ‘AM03, AM05, AM06’ 常规尺寸产品的纸带尺寸

Dimensions of paper taping for AM03, AM05, AM06 types.



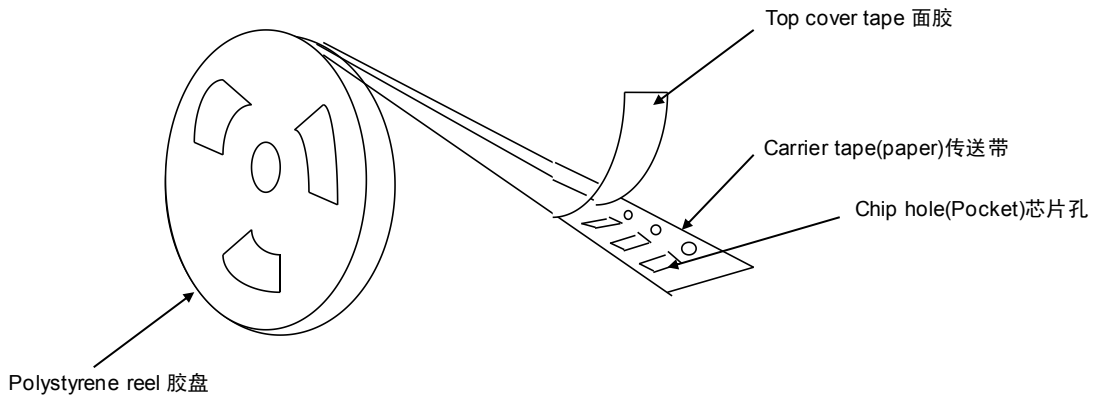
代号Code 纸带规格 paper size	A	B	C	D*	E	F	G*	H	J	T
AM03	1.10 ±0.10	1.90 ±0.10	8.00 ±0.10	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50 -0/+0.10	1.10 Max
AM05	1.45 ±0.15	2.30 ±0.15	8.0 ±0.15	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50 -0/+0.10	1.10 Max
AM06	1.80 ±0.20	3.40 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50 -0/+0.10	1.10 Max

注意：*表示此处对尺寸的要求非常精确。

Note: The place with “*” means where needs exactly dimensions.

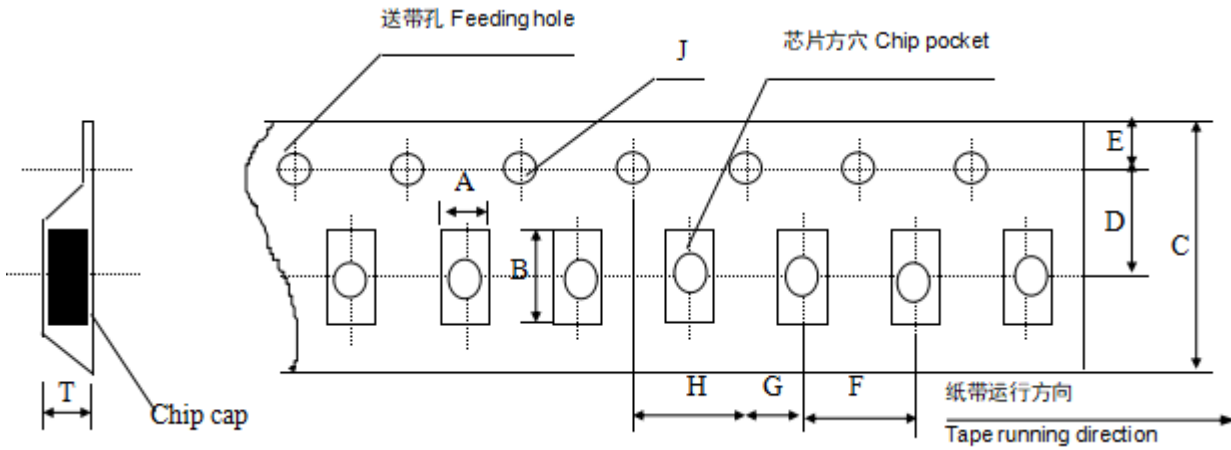
* 塑胶卷盘结构

Embossed taping



* 塑胶带尺寸结构(适合‘AM05~AM12’型产品)

Dimensions of embossed taping for AM05~AM12 type



Unit: mm

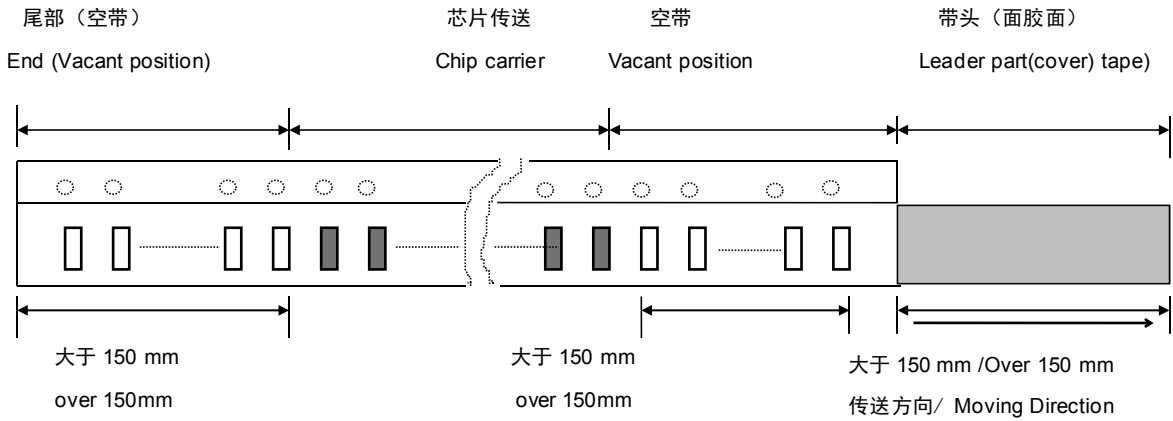
代号 Code 规格 Tape size	A	B	C	D*	E	F	G*	H	J	T
AM05	1.55 ± 0.20	2.35 ± 0.20	8.00 ± 0.20	3.50 ±0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	4.00 ± 0.10	1.50 -0/+0.10	1.50 Max
AM06	1.95 ± 0.20	3.60 ± 0.20	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	4.00 ± 0.1	1.50 -0/+0.10	1.85 Max
AM10	2.70 ± 0.10	3.42 ± 0.10	8.00 ±0.10	3.50 ± 0.05	1.75 ± 0.10	4.00 ±0.10	2.00 ± 0.05	4.00 ± 0.10	1.55 -0/+0.10	3.2 Max
AM08	2.20 ± 0.10	4.95 ±0.10	12.00 ± 0.10	5.50 ± 0.05	1.75 ± 0.10	4.00 ±0.10	2.00 ± 0.05	4.00 ± 0.10	1.50 -0/+0.10	3.0 Max
AM12	3.66 ± 0.10	4.95 ± 0.10	12.00 ± 0.10	5.50 ± 0.05	1.75 ± 0.10	8.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.55 -0/+0.10	4.0 Max
AM20	6.2 ± 0.1	6.7 ±0.1	12.00 ± 0.10	5.50 ± 0.05	1.75 ± 0.10	8.00 ±0.10	2.00 ± 0.05	4.00 ±0.10	1.55 -0/+0.10	2.4 ± 0.10

备注：*表示此处对尺寸的要求非常精确。

Note: The place with "*" means where needs exactly dimensions.

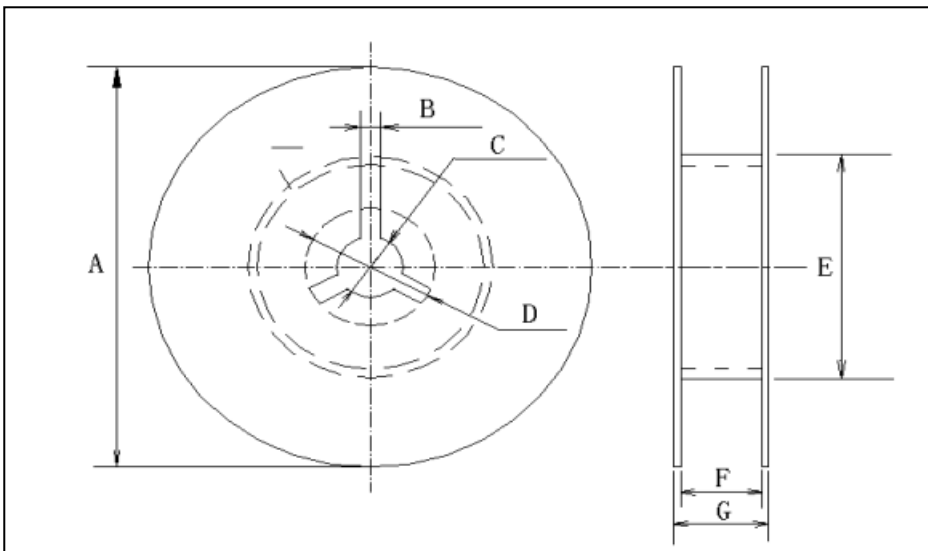
* 传送带的前后结构

Structure of leader part and end part of the carrier paper



* 卷盘尺寸

Reel dimensions (unit: mm)

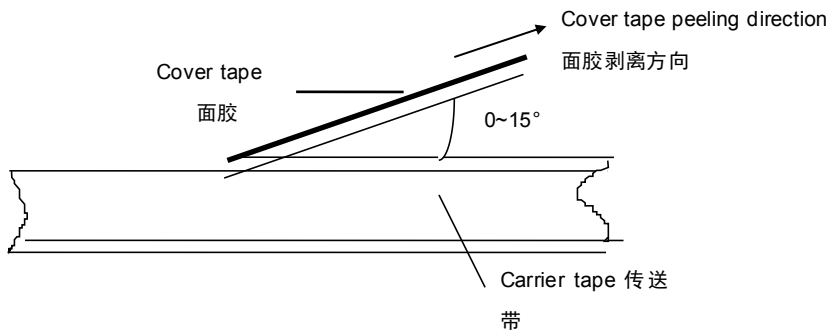


卷盘型号 Reel model	A	B	C	D	E	F	G
7'REEL	$\phi 178 \pm 2.0$	3.0	$\phi 13 \pm 0.5$	$\phi 21 \pm 0.8$	$\phi 50$ 或更大 $\phi 50$ or more	10.0 ± 1.5	12max

* 关于卷带的说明：面胶剥离强度

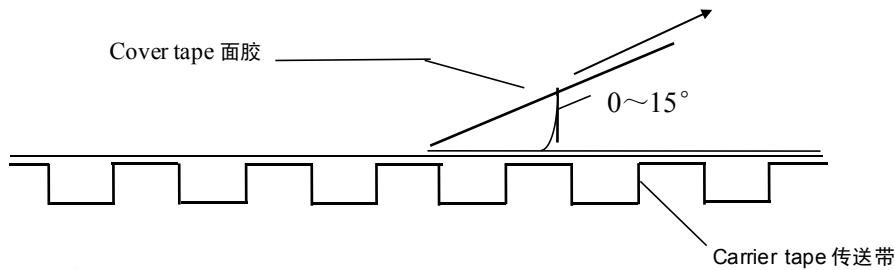
Taping specification: top tape peeling strength

* 纸带 Paper Taping



*** 塑料胶盘 Embossed Taping**

Cover tape peeling direction 面胶剥离方向



标准：0.1N<剥离强度<0.7N

Standard: 0.1N < peeling strength < 0.7N

在剥离时，纸带不能有纸碎，也不能粘在底、面胶上。

No paper dirty remains on the scotch when peeling, and sticks to top and bottom tape.

*** 塑料盒散包装**

Bulk Case Package

单位 (unit) :mm

Symbol	A	B	T	C	D	E
Dimension	6.80±0.10	8.80±1.00	12.00±0.10	15.00+0.10/-0	2.00+0/-0.10	4.70±0.10
Symbol	F	W	G	H	L	I
Dimension	31.50+0.20/-0	36.00+0/-0.20	19.00±0.35	7.00±0.35	110.00±0.70	5.00±0.35

*** 包装数量**

Packing Quantity

尺寸 (SIZE)	包装形式和数量 (Package Style & Quantity) unit: pcs			
	纸带卷盘 (PT)	胶带卷盘 (ET)	塑料盒散装 (BC)	一般散装 (BP)
AM01	15000	-----	20000	5000
AM02	10000	-----	20000	5000
AM03	4000	-----	15000	5000
AM05	4000	3000	10000	5000
AM06	4000	T≤1.35mm 3000 T>1.35mm 2000	5000	5000
AM10	-----	T≤1.80mm 2000 T>1.80mm 1000	-----	2000
AM08	-----	2000	-----	2000
AM12	-----	T≤1.85mm 1000 T>1.85mm 500	-----	2000
AM20	-----	500	-----	-----

注意：包装的形式和数量可根据客户的要求来定。

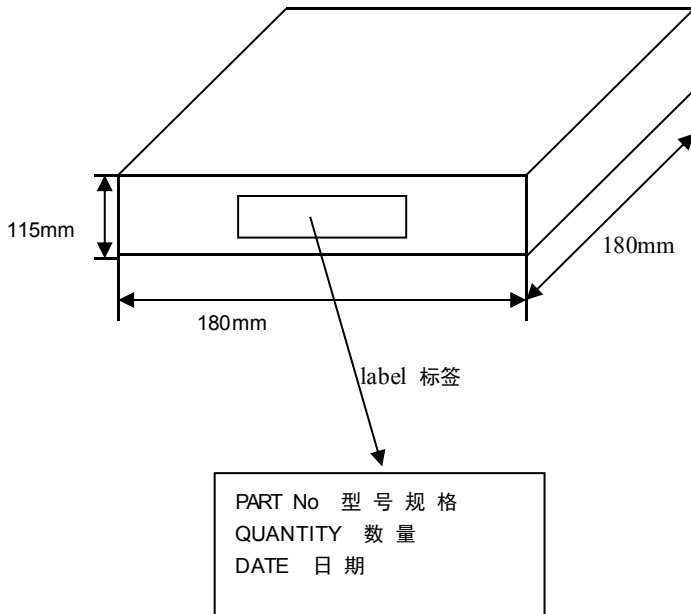
Note: We can choose packing style and quantity can be according to the customer's requirement.

*** 外包装**
Outer packing

小包装 The first package

Quantity: 10 reels

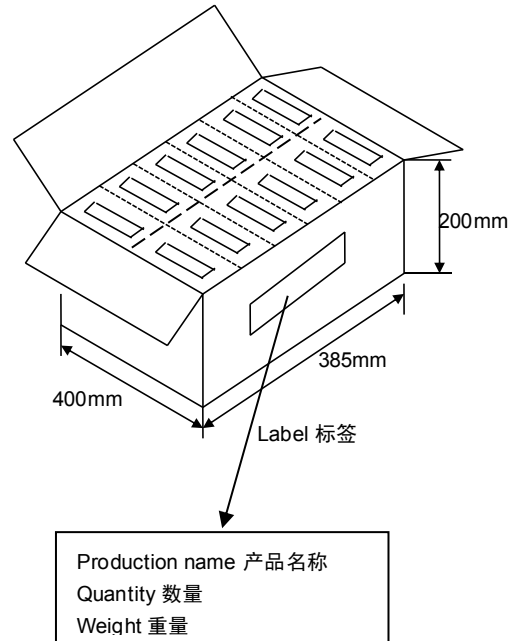
数量： 10 卷



大包装 The second package

Quantity: 6 cases

数量： 6 盒


◆储存方法
Storage Methods

* 确保芯片可焊性良好的贮存期限为 12 个月 (在包装好已交付的情况下)。

The guaranteed period for solderability is 12 months (Under deliver package condition).

* 储存条件 Storage conditions:

储存温度/Temperature 5~40℃

储存相对湿度/Relative Humidity 20~70%

◆使用前的注意事项
Precautions For Use

多层片式瓷介电容器 (MLCC) 在短路或开路的电路中都有可能失效, 在超出本承认书或相关说明书中所述使用频率的恶劣工作环境, 或外界机械力超压作用下, 电容芯片都有可能着火、燃烧甚至爆炸, 所以在使用的时候, 首先应考虑按本承认书的有关说明来进行, 如有不明之处, 请联系我们技术部、品管部或生产部.

The Multi-layer Ceramic Capacitors (MLCC) may fail in a short circuit mode in an open circuit mode when subjected to severe conditions of electrical environment and / or mechanical stress beyond the specified "rating" and specified "conditions" in the specification, which will result in burn out, flaming or glowing in the worst case. Following "precautions for "safety" and Application Notes shall be taken in your major consideration. If you have a question about the precautions for handling, please contact our engineering section or factory.

* 焊接的条件与相关图表

Soldering Profile

为避免因温度的突然变化而引起的芯片开裂或局部爆炸的现象发生, 请按有关温度曲线图表来进行. (请参考附页中的图表)

To avoid the crack problem by sudden temperature change, follow the temperature profile in the adjacent graph (refer to the graph in the enclosure page).

*** 手工焊接**

Manual Soldering

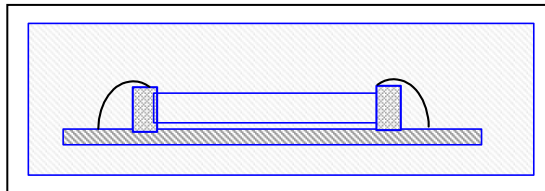
手工焊接很容易因为芯片局部受热不均而引起瓷体微裂或局部爆炸的现象。在焊接时，如果操作者不小心，会使烙铁头直接同电容芯片的瓷体部分接触，这样很容易使电容芯片因热冲击而受损或出现其他意外。因此，使用电烙铁手工焊接时应仔细操作，并对电烙铁的尖端的选择和尖端温度控制应多加小心。

Manual soldering can pose a great risk of creating thermal cracks in capacitors. The hot soldering iron tip comes into direct contact with the end terminations, and operator's careless may cause the tip of the soldering iron to come into direct contact with the ceramic body of the capacitor. Therefore the soldering iron must be handled carefully, and pay much attention to the selection of the soldering iron tip and temperature contact of the tip.

***适量的焊料**

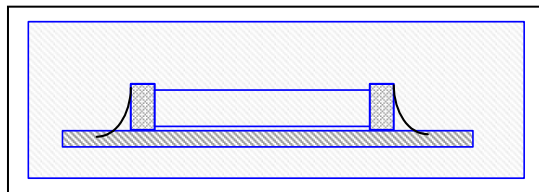
Optimum Solder Amount for Reflow Soldering

焊料过多
Too much solder



这样会因端头压力过大而
可能引起芯片受损
Cracks tend to occur due to large stress.

焊料太少
Not enough solder



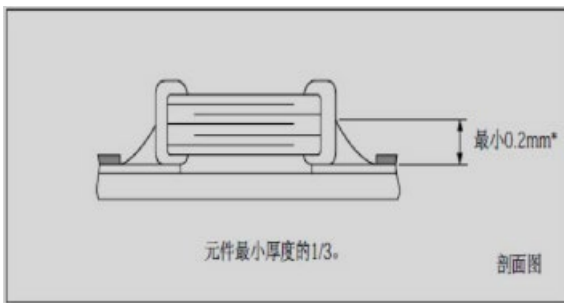
固定力量不足，可能会引起
电容芯片与线路接触不良
Weak holding force may cause
bad connection
between the capacitor and PCB.

*** 推荐焊料用量**

Recommended Soldering amounts

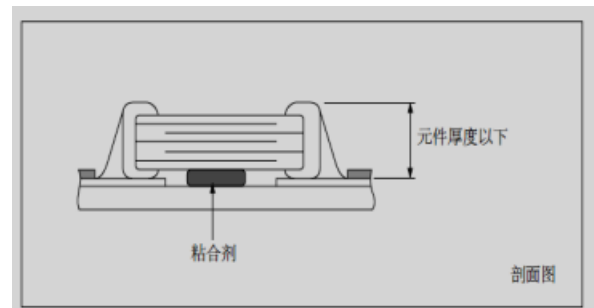
回流焊接的最佳焊料用量

The optimal solder fillet amounts for re-flow soldering



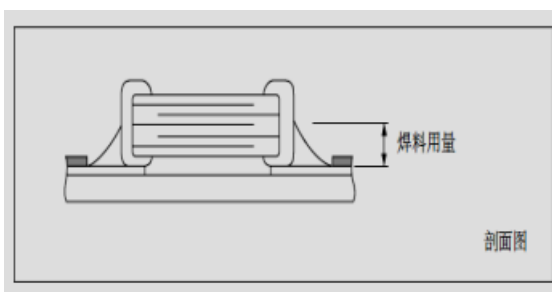
波峰焊接的最佳焊料用量

The optimal solder fillet amounts for wave soldering



使用烙铁返修时的最佳焊料量

The optimal solder fillet amounts for reworking by using soldering iron



* 推荐焊接方式

Recommended Soldering Method

规格 Type	温度特性 Temperature characteristics	焊接方式 Welding method	规格 Type	温度特性 Temperature characteristics	焊接方式 Welding method
AM01	NPO	R	AM05	NPO	R
	X7R /X7S/X7T/X5R	R		X7R /X7S/X7T/X5R	R
AM02	NPO	R	AM06	NPO	R
	X7R /X7S/X7T/X5R	R		X7R /X7S/X7T/X5R	R
AM03	NPO	R	≥AM10	NPO	R
	X7R /X7S/X7T/X5R	R		X7R /X7S/X7T/X5R	R

焊接方式 Soldering method:

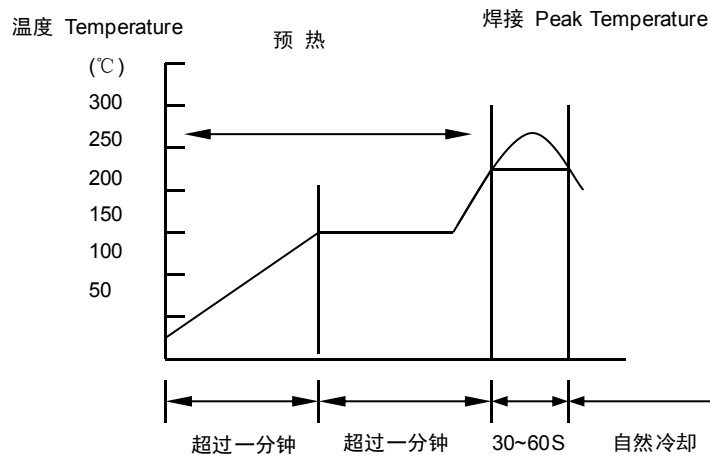
R—回流焊 Reflow Solering

W—波峰焊 Wave Soldering

◆ 推荐焊接温度曲线图

The temperature profile for soldering

* 回流焊接 (Re-flow soldering)



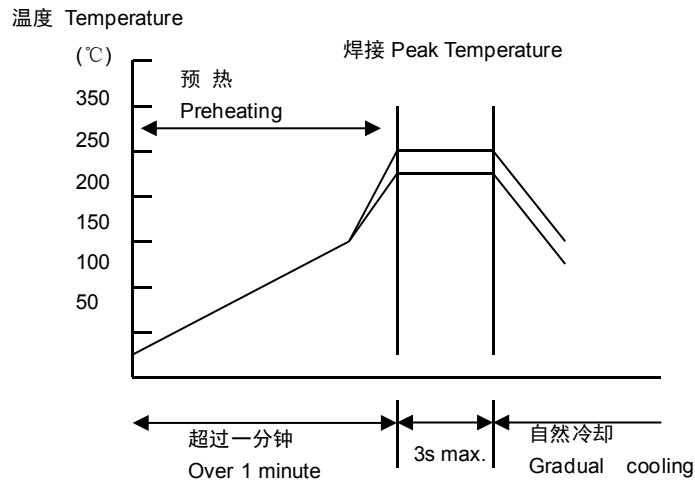
	Pb-Sn 焊接 Pb-Sn soldering	无铅焊接 Lead-free soldering
尖峰温度 Peak temperature	230℃~250℃	240℃~260℃

在预热时, 请将焊接温度与芯片表面温度之间的温差维持在 $T \leq 150^\circ\text{C}$ 。

While in preheating, please keep the temperature difference between soldering temperature and surface temperature of chips as: $T \leq 150^\circ\text{C}$.

*** 手工焊接**

Hand soldering



条件 Conditions:

预热 Preheating	烙铁头温度 Temperature of soldering iron head	烙铁功率 Power of soldering iron	烙铁头直径 Diameter of soldering iron head	焊接时间 Soldering time	锡膏量 Solder paste amount	限制条件 Restricted conditions
$\Delta \leq 130^{\circ}\text{C}$	最高 350°C Highest temperature: 350°C	最大 20W 20W at the highest	建议 1mm 1mm recommended	最长 3s 3s at the longest	$\leq 1/2$ 芯片厚度 $\leq 1/2$ chip thickness	请勿使用烙铁头直接接触陶瓷元件 Please avoid the direct contact between soldering iron head and ceramic components

* 以最新版本的内容为准

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